

**CLAIMS**

- 1     An ultrasonic transducer structure, comprising  
  
a first ultrasonic transducer element (1), arranged and operable for transmitting an ultrasonic signal from a front face of the structure,  
  
damping material (2) at the back of the first ultrasonic transducer element (1), and  
  
a second ultrasonic transducer element (3) in or on the damping material behind the first ultrasonic transducer element (1), arranged and operable to receive sound energy propagated through the damping material (2) when the first ultrasonic transducer element (1) is operated to transmit an ultrasonic signal from the front face.
- 2     An ultrasonic transducer structure as claimed in claim 1, comprising  
  
a plurality of first ultrasonic transducer elements (1), arrayed and operable for transmitting ultrasonic signals from a front face of the structure,  
  
damping material (2) at the back of each first ultrasonic transducer element (1), and  
  
a plurality of second ultrasonic transducer elements (3) in or on the damping material, arranged behind respective corresponding first ultrasonic transducer elements (1), each operable to receive sound energy propagated through the damping material (2) when the corresponding first ultrasonic transducer element (1) is operated to transmit an ultrasonic signal from the front face.
- 3     An ultrasonic transducer structure as claimed in claim 1, comprising

a plurality of first ultrasonic transducer elements (1), arrayed and operable for transmitting ultrasonic signals from a front face of the structure,

damping material (2) at the back of each first ultrasonic transducer element (1),

a second ultrasonic transducer element (3) arranged in or on the damping material behind the array of first ultrasonic transducer elements (1), operable to receive sound energy propagated through the damping material (2) when any first ultrasonic transducer element (1) of the array is operated to transmit an ultrasonic signal from the front face.

- 4 An ultrasonic transducer structure as claimed in claim 1, 2 or 3, wherein the or each first ultrasonic transducer element (3) is a transmit/receive transducer element.
- 5 An ultrasonic transducer structure as claimed in claim 1, 2, 3 or 4, wherein the or each second ultrasonic transducer element (3) is polyvinylidene fluoride film transducer element.
- 6 An ultrasonic transducer structure as claimed in any preceding claim, wherein the or each second transducer element (3) is adapted to detect sound energy at signal frequencies in a lower frequency range, for example at frequencies in the range 2 to 3 MHz.
- 7 A method of monitoring the performance of an ultrasonic transducer structure, as claimed in any preceding claim, used for ultrasonic inspection of an object, wherein the or each second transducer element (3) is operated to detect sound energy propagated through the damping medium (2) from the or the corresponding first transducer element (1) when that element is operated to transmit an ultrasonic signal from the front face of the structure, and signals provided by the or each second transducer element (2) in correspondence to the detected sound energy are analysed, whereby the performance of the or each first

transducer element (1) is individually monitored.

- 8 A method as claimed in claim 7, wherein the or each second transducer element (3) is operated to detect sound energy propagated through the damping medium (2) from the or the corresponding first transducer element (1) when that element is operated to transmit an ultrasonic signal from the front face of the structure in the course of inspection of an object, whereby the performance of the or each first transducer element (1) is individually monitored during inspection of the object.
- 9 A method as claimed in claim 7, wherein the or each second transducer element (3) is operated to detect sound energy propagated through the damping medium (2) from the or the corresponding first transducer element (1) when that element is individually operated to transmit an ultrasonic signal from the front face of the structure in the course of testing routine, when object inspection is not being carried out.
- 10 An ultrasonic transducer structure, or a method of monitoring such a transducer structure, substantially as hereinbefore described with reference to Figure 1 or Figure 2 of the accompanying drawings.